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Management of Construction Change Orders
A Guide for Grantees

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This guidance is offered to a Grantee for managing the change order process on a construction contract under a grant from the U.S. Environmental Protection Agency (EPA) construction grants program. The establishment of a change order procedure serves to expedite changes that arise during the construction of a project. Uniform procedures reduce confusion and multiple submissions of data for each change. Efficient execution of a change order management procedure can save both time and money.

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Preface

This guidance is offered to a Grantee for managing the change order process on a construction contract under a grant from the U.S. Environmental Protection Agency (EPA) construction grants program. The establishment of a change order procedure serves to expedite changes that arise during the construction of a project. Uniform procedures reduce confusion and multiple submissions of data for each change. Efficient execution of a change order management procedure can save both time and money.

The sections are arranged according to the order of activities to be followed in managing the process, from the first claim or recommendation for a change to the reviewing agency's (EPA or delegated State agency) acceptance of the formal change order document. The discussion of the Grantee's duties and responsibilities emphasizes the need to decide whether a change order is actually warranted. Also given particular emphasis is the negotiation process, the purpose of which is to develop the terms and conditions for the formal change order document. The point is made that the level of detail should be appropriate to the dollar amount and complexity of a change order. Typical change order review procedures used by a reviewing agency have been included in the last chapter, since an understanding of the review process should help the Grantee to properly prepare the change order for review and thus avoid delays in approval.

While this guidance should prove useful to most Grantees, it was styled particularly for those who are faced with managing a grant-assisted construction project for the first and possibly only time. It is therefore somewhat general in its presentation, leaving extensive detail to the many other available texts on the subject.

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Introduction

A change order is a written order by the Grantee to the Construction Contractor authorizing an addition, deletion or revision in the work and/or the time of completion within the limits of the construction contract after it has been executed. It is a specific type of contract modification which does not go beyond the general scope of the existing contract.

The change order management procedure is used when a need is recognized for a change in the terms or conditions of existing signed contract documents. It generally originates as a claim or a recommendation for a change from the Construction Contractor or as a request-for-proposal from the Grantee, seeking a change to existing contract documents. The change order is necessary to increase or decrease the contract cost or work, interrupt or terminate the project, revise the completion date, alter the design, or in general to implement any deviation from the original contract terms and conditions.

The successful completion of the change order management process depends upon the successful execution of the responsibilities of each of the participants: Grantee, Engineer, Construction Contractor, and reviewing agency (U.S. Environmental Protection Agency (EPA) or delegated State agency). The Grantee must understand that it alone is responsible for financing and managing the project to completion. Because of this, the Grantee is responsible for determining whether a proposed change is necessary and whether the cost of the change is reasonable without regard to grant assistance. The Engineer is the technical advisor to the Grantee. The Construction Contractor is responsible for preparing and submitting the proposal for change and supporting documentation to the Grantee. Using the proposal, the Grantee negotiates the conditions of change with the Construction Contractor. The Grantee then prepares and presents the change order plus supporting documentation to the reviewing agency. The reviewing agency checks the documentation for completeness and adequacy and the allowability of costs, so that grant participation for the change can be evaluated. A section on typical reviewing agency procedures for review of a change order has been included to give the Grantee an insight into the responsibilities of the reviewer.

The bilateral change, rather than the unilateral change, is one agreed to by both parties, and is most desirable since it minimizes disputes at a later date. Should meaningful negotiations fail, an EPA Grantee, as a last resort, has the authority to make a unilateral change within the scope of the contract. In order to move the project forward, the Grantee can issue a change order without Construction Contractor agreement under a "changes" contract clause. In this case, the Construction Contractor must perform the work, but may elect to dispute the terms and could recover additional costs from the Grantee under the same clause. In some cases, State Law may give the Construction Contractor specific rights of recovery.

The procedures outlined herein apply to open, competitively bid, fixed lump sum or fixed unit price construction contracts and have been adapted to the EPA construction grants program. Additional State and local requirements may also be encountered in obtaining change order approval.

Reference to Federal Regulations

This guidance describes a change order management process which is based upon a combination of EPA regulations and good management practices. Where the EPA regulations require that certain procedures be followed, the pertinent regulation has been cited by specific reference to the *Code of Federal Regulations* (CFR). It is important to keep in mind that each construction grant is governed by the regulations in effect at the time the grant was awarded. Because the regulations have been revised a number of times since the beginning of the EPA construction grants program, multiple citations are sometimes given. This guidance will suggest a reasonable course of action in those particular cases, but the regulations should be referred to if there is a question of their applicability to a particular grant.

1981 Amendments to the Clean Water Act

The date of May 12, 1982, is mentioned throughout this guidance because this is when an extensive revision of EPA's construction grant and procurement regulations were published in interim final form, which made them effective for all grants awarded on or after that date. At the time this guidance was published, these new regulations were not yet published in final form. The final regulations will apply to grants awarded on or after their publication date. These new regulations substantially streamlined the construction grants and procurement processes, especially in the area of procurement of engineering and construction services. This revision followed enactment of the 1981 Amendments to the Clean Water Act. Since the role of the reviewing agency is lessened by these new regulations, it is doubly important that the Grantee understand and carefully manage the change order process on the project.

Duties and Responsibilities of the Participants

The Grantee is responsible for the administration and implementation of the project for which EPA Construction Grant assistance is awarded. In accepting the grant, the Grantee has agreed to pay, pursuant to Section 204(a)(4) of the Clean Water Act, the non-federal costs of treatment works construction associated with the project. The Grantee is also financially responsible for any additional non-federal costs associated with a change. Should the reviewing agency determine that the change order is not allowable for federal participation, the entire cost would then be considered non-federal costs.

(40 CFR 33.210; 35.936-5)

The Grantee is the one who must agree to any change in the conditions of the construction contract because it is the only party that has entered into the contract with the Construction Contractor. Grantee authority is exercised by the legislative body through an authorized representative, e.g., mayor, business administrator, etc. The Grantee should expect the Engineer to exercise that authority stipulated in the agreement for engineering services. The Grantee should be aware that the reviewing agency has no authority to originate changes to contract documents.

A construction manager is sometimes retained by the Grantee, particularly when its own forces do not have the expertise or additional time available to properly manage the additional responsibilities. EPA encourages the construction manager concept, but it should be discussed with the reviewing agency before any commitments are made. While the construction manager's role and contractual relationship with the Grantee differ from those of the Engineer, it is possible for the Engineer to assume both roles. The construction manager would normally be delegated a part of the Grantee's authority through their contract, so that throughout this guidance any mention of the Grantee is generally intended to include the construction manager if one has been retained.

Once a grant is awarded and construction is underway, the Grantee should not presume that the Engineer, Construction Contractor and regulatory agencies will oversee the management of the project. In the best interest of the community, the Grantee should actively manage the project to completion. The resolution of complex and controversial questions cannot be postponed. The Grantee should stay fully informed and be ready to act on problems arising daily from the construction. The Grantee can expect to be faced with proposals to change the terms of the construction contract, and may encounter circumstances requiring it to initiate modifications. The Grantee should be convinced that a proposed contract change is necessary and reasonable regardless of federal participation in the cost. The Grantee is responsible for negotiating fair and reasonable cost and time adjustments for a necessary change and should ensure competent, timely processing of change order requests.

Grantee's Responsibilities

The Grantee is responsible for:

- Determining whether a change order is warranted.
- Negotiating a fair and reasonable price for required changes, or authorizing the Engineer to do so.
- Maintaining costing records for the change including records of negotiation.
- Maintaining current and accurate fiscal projections of contract and project completion costs.
- Resolving disputes which may have arisen as a result of a proposal for a change.
- Notifying the reviewing agency in writing of events or proposed changes which may require a grant amendment. These include:
  - Conditions which require prior written approval as included in *Prior Approval Requirements* on page 3.
  - Significant changed conditions at the project site.
  - Changes which may increase or substantially decrease the EPA grant needed to complete the project.
  - Significant delay or acceleration of the project schedule. This requires continuous monitoring of the Construction Contractor's construction schedule.

(40 CFR 30.600, 30.700; 30.900; 33.210; 35.930-6; 35.936-5; 35.938-5)

Engineer's Role

The Engineer will be expected to:

- Act as consultant to the Grantee during the construction of the project and on changes that are proposed.
- Provide expert opinion on whether a change is appropriate or not, and if so, why.
- Prepare a fair and reasonable independent cost and time estimate on the proposed change to verify that the estimate prepared by the Construction Contractor is fair and reasonable.
- Negotiate change orders if authorized to do so by the Grantee.

Construction Contractor's Responsibilities

In order to expedite the processing of a change order, the Construction Contractor will be expected to:

- Furnish and certify the correctness of sufficient cost and pricing data to enable the Grantee to determine the necessity and reasonableness of cost and amounts proposed, and to enable the reviewing agency to determine the eligibility and allowability of costs proposed.
- Submit change order proposals within the time allowed by the contract and enter into meaningful negotiations on a necessary contract change.
- Comply with the record keeping and accounting requirements set by EPA reg-

ulations appropriate to the dollar amount of the change order.

- Maintain a current construction schedule, such as a critical path diagram as described below, with the level of detail based on project size and complexity.

(40 CFR 33.1030, Clause 8; 35.938-5; Part 35, Subpart E, App. C-2, Clause 11)

Construction Schedule

Among the scheduling techniques used by the Construction Contractor, one frequently used is called the Critical Path Method (CPM). This is a system where all the construction operations which have to be done in sequence are shown on a line diagram. The diagram shows the sequence and length of time it takes to complete each operation by representing each operation with an arrow. By tracing along the various paths of the series of arrows, the Construction Contractor can determine which path establishes the minimum time to complete the work. That path is called the Critical Path and changes in the timing of operations along it normally affect the time of completion. Construction contracts often require the use and periodic updating of the CPM diagram to control project progress and analyze the effect of delays.

Prior Approval Requirements

In order to obtain change order approval, written approval from the reviewing agency is in some cases required prior to the start of work associated with the change, because of the significant effect on performance or cost of the project. Conditions which require prior written approval (which is always a formal grant amendment on grants awarded on or after May 12, 1982) include the following:

- Project changes which
  - Alter the project scope or project performance standards.
  - Alter the type of treatment to be provided.
  - Substantially alter the facilities plan, design drawings and specifications, or the location, size, capacity, or quality of any major part of the project.
  - Increase the EPA grant needed to complete the project.
  - Significantly delay or accelerate the project schedule.
- Contract changes involving dollar amounts of $100,000 or more on grants awarded before May 12, 1982, if
  - any single item (additive or deductive) exceeds $100,000.
  - no single item has a value of $100,000, but the total price of the change order is over $100,000.
  - the total of the additive items of work in the change order exceeds $100,000, or the total of the deductive items of work in the change order exceeds $100,000 even though the net value of the change order is less than $100,000.
- However, related work must not be split into two or more amendments or change orders merely to keep it under $100,000 and avoid the need for prior approval.
- For grants awarded on or after May 12, 1982, the reviewing agency may review proposed change orders over $100,000 if the Grantee has not self-certified its procurement system. Under these circumstances, the Grantee should request prior review.

Prior approval is not required for changes to correct minor errors or minor changes not addressed by the above mentioned prior approval requirements. It is also not required for emergency changes as defined below.

It should be noted that the reviewing agency will respond to requests for prior approval as promptly as possible in order to avoid undue project delays. Therefore, the approval may only cover the concept of the change, even though certified cost and pricing data must be furnished when prior approval is required because the amount of the change is $100,000 or more. Because of this, the approval could be subject to revision based on later review of the necessity and reasonableness of quantities, cost/price analysis, and allowability of costs.

(40 CFR 35.935-11; 35.938-5; 35.2204)

Emergency Changes

An emergency may be described as an unforeseen combination of circumstances leading to a hazard to life or health which can only be alleviated by immediate action. Although prior approval is not required for emergency changes, the reviewing agency should be notified as soon as possible after the emergency has been put under control if the work would otherwise have required prior approval.

Grant Increases

It should be noted that approval of a project change or change order does not obligate EPA to any increase in the amount of the grant or grant payments unless an amendment to increase the grant is also approved. This is further explained in *Grantee Notification* on page 14.

(40 CFR 35.930-6; 35.935-11; 35.2204)

Disputes

Many of the delays and misunderstandings surrounding the modification process can be avoided by effective and frequent communication between the Grantee and the Construction Contractor. The Grantee bears the entire responsibility to settle Construction Contractor claims. When a claim is submitted, the Grantee should request and obtain a change order proposal from the Construction Contractor, investigate the circumstances promptly, reach a tentative decision on the merits, and notify the Construction Contractor of that decision, justifying the position based upon the plans, specifications, and other contract documents. In reaching that decision, the Grantee may find it advisable to obtain legal advice or to consult with representatives of the reviewing agency.

If the Grantee determines that a change order proposal is meritorious, it should be negotiated and settled through a bilaterally-executed change order. If the Grantee determines that a change order proposal is unmeritorious, the Construction Contractor may decide to pursue the claim through litigation, arbitration, or other form of dispute resolution. In that case, the Grantee may request the reviewing agency's advice and assistance prior to assessing and/or defending against the claim. Reviewing agency technical and legal assistance can also be requested for the administration and enforcement of construction contracts, especially where a dispute may jeopardize completion of the project. The following chapter, entitled *Conditions that May Warrant a Change Order* will be of assistance in judging the merit of a change order proposal. Prompt action to resolve disputes cannot be overemphasized, since efficient execution of the entire change order management process can save both time and money.

(40 CFR 33.210; 35.936-5; 35.938-5; 35.970; 35.2350)

Conditions that May Warrant a Change Order

A change order is issued in writing from the Grantee to the Construction Contractor, stating that it represents a change to the contract. This is normally done after the Grantee determines that a proposed change is necessary. The change order proposal may have originated from either the Grantee's own perception of the situation or from a request by the Construction Contractor.

The following are common categories of conditions which generally give rise to a need for contract changes:

- Differing site conditions
- Errors and omissions in plans and specifications
- Changes instituted by regulatory agencies
- Design changes
- Overruns/underruns in quantities
- Factors affecting time of completion

It is possible that some change order proposals may fall outside of these categories. However, others commonly have characteristics similar to the categories mentioned. Therefore, they can be related to the reasoning process developed in one or more of these six mentioned categories.

To make the decision as to whether a change order is warranted, the Grantee should first determine if there is any basis for questioning the existing plans and specifications. If there is, then it should be decided whether any action is needed to insure that the work will be completed to meet the intent of the project. The next step is to determine whether the situation can be resolved by clarifying the part of the plans and specifications over which there is disagreement, rather than authorizing a change. If it is then mutually agreed between the Grantee and Construction Contractor that a change order is needed, it should be expeditiously prepared.

In contrast to the mutually recognized need for a change, certain acts or failure to act by the Grantee which increase the Construction Contractor's costs and/or time of performance may also be considered grounds for a change order. This is termed a constructive change and must be claimed in writing by the Construction Contractor within the time limit specified in the contract documents in order to be considered. The Grantee should evaluate a change order proposal based on such a claim fairly and can use the same reasoning process as any other proposal.

Differing Site Conditions

A "differing site conditions clause" or its equivalent in an EPA grant-assisted construction contract will describe differing site conditions as:

- Subsurface or latent physical conditions at the site differing materially from those indicated in the contract, or
- Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.

The premises on which a differing site conditions clause in an EPA grant-assisted construction contract rests may be described as follows:

- Each bidder is not expected to perform an independent subsurface site investigation prior to submission of bid. However, bidders are generally advised by the contract documents to make a site inspection.
- The contract bid price is proportional to the degree of risk the Construction Contractor must provide for in its competitive bid.
- The most cost effective construction is obtained by accepting certain risks for latent or subsurface site conditions.

It should be noted that other clauses of the contract documents may impact upon the resolution of a change order which was originally initiated under a "differing site conditions" clause, such as, for example: a requirement to make a site inspection prior to bidding.

Considerations for Evaluating Need for a Change

Contract Documents

- What is the differing site condition?
- What is the site condition shown on the plans?
- What sections of the specifications are applicable?
- Do the parties have the latest revised issue of plans and specifications?
- Have the parties checked all the plan references? Plans are usually segregated by specialty: architectural, site, plumbing, mechanical, structural, electrical, special and standard details. A critical note or dimension on one of the specialty drawings may solve the whole puzzle of need and responsibility.
- Does the Grantee have all the available data describing actual field conditions: Inspector reports, sketches, dimensions, photographs (before and after construction)? Even if the Grantee went into the field to see the problem, it may not be possible to observe critical differences in conditions.
- Has the inspection staff provided adequate data? If not, correct that situation *immediately*. The next "claim" could be much larger.
- Why was the condition shown differently in the design?
- Was provision made for this situation in the contract documents?
- Did the Construction Contractor encounter unstable soils, rock excavation, or subsurface structures where no careful prebid site inspection and contract documents could have predicted their existence?
- Was the Construction Contractor forced to employ unusual construction techniques and equipment to overcome the obstacles encountered?
- Can the Construction Contractor's performance, selection of construction procedures, and response to site con-

ditions be evaluated by the Engineer (or possibly a third party) experienced in modern construction techniques?

Construction Contractor Compliance

- Did the Construction Contractor promptly and before such conditions were disturbed comply with Grantee notification requirements?
- Does the Construction Contractor have appropriately trained and experienced personnel; have adequate modern equipment where needed; use methods and techniques consistent with accepted practice?
- Did the Construction Contractor make a site inspection and evaluation of conditions prior to bidding?
- Is the construction layout correct? Who made the stake-out; who checked the stake-out?
- Did utility companies respond and locate their facilities? Did the Construction Contractor protect or obliterate utility mark-outs and use suitable construction techniques to protect structures and utilities?

Subsurface Investigation

- Were borings made or test holes dug; displayed correctly; available to all bidders; of proper kind and depth; spaced at reasonable intervals? Contract documents often have disclaimers regarding differing subsurface conditions, but these are not always as enforceable as they appear.
- Was the overall subsurface investigation in proportion to the type and magnitude of the project?
- Was the geologic history of the site incorporated into the subsurface investigation data displayed in the contract documents?
- Although not part of the evaluation, the Grantee should consider whether additional subsurface investigation should be initiated immediately to minimize future claims and delays.

Once the information on differing site conditions is assembled, the Grantee should be in a position to determine if the site conditions differ materially from those indicated in the contract or those ordinarily encountered and whether this will cause an increase in the Construction Contractor's cost or the time to complete the work. If the Grantee determines that a change order is needed, it should provide supporting documentation including reports, pictures, plans and whatever is appropriate to demonstrate where and how actual conditions deviated from the plan or from conditions that should have been anticipated.

(40 CFR 33.1030, Clauses 3 and 4; Part 35, Subpart E, App. C-2, Clauses 2 and 3)

Errors and Omissions in Plans and Specifications

Errors and omissions are usually design or drafting deficiencies in the plans and specifications. Errors on plans and specifications are items which are shown incorrectly, while omissions are items which are not shown at all.

Errors and omissions in plans and specifications may be expected on any large complex project and are usually brought to the attention of the Grantee through the Engineer, Construction Contractor or supplier. Many errors are corrected by alert inspectors before incurring unnecessary additional costs. However, some errors may lead to disputes between the Engineer and Construction Contractor. The Grantee is responsible for resolving the dispute and may have difficulty in assessing the situation, since the Engineer may have also been the designer and may strongly feel that the design was adequate. Moreover, there may be no clearly discernible line between design errors and faulty materials or installation by the Construction Contractor. The Grantee may seek opinions from independent third parties experienced in modern design practices to aid in the more complex decision making, but should request prior approval from the reviewing agency before contracting with a third party.

The terms of an EPA-grant assisted designer's contract require the correction of errors/omissions in the drawings or specifications without additional compensation.

Time spent negotiating an Engineer/Construction Contractor dispute should not extend the time of completion. However, a finding of design deficiency may be grounds for time extension equal to that delay caused by the error itself.

Considerations for Evaluating Need for a Change

- What is the error or omission?
- Where are all the pertinent references in plans and specifications?
- Is the intention of the pertinent references obvious and will they result in meeting project objectives?
- Did the error/omission lead to increased Construction Contractor costs?

Essentially, a change order in this category is necessary when some part of the project will not operate properly without that change to the extent intended if the error or omission had not occurred.

The Grantee should evaluate these requests carefully, since not all errors or omissions necessitate a change to the contract price and/or time. While the Construction Contractor is entitled to an equitable adjustment, it may have incurred no additional expense and may have no right to a claim even though an error or omission has occurred. If expense was decreased, a credit could be due the Grantee. The Grantee should pursue the available remedies against all parties who are responsible for the added costs of a change to protect itself against vicarious liability for the improper actions of others.

(40 CFR, 33.1030, Clause 13; Part 35, Subpart E, App. C-1, Clause 2)

Changes Instituted by Changes in Regulatory Requirements

Compliance to changes in the law or in the requirements of government agencies may necessitate a change order. Typical examples are: changed requirements for protecting historical or archaeological objects, revisions to building codes, or revised road construction plans. The need for this type of change should be well documented with sources and dates. Justification for change should include correspondence, records and notes demonstrating that the requirements could not have been incorporated into the contract documents prior to bid date.

Considerations for Evaluating Need for a Change

- Is this a change or more stringent enforcement of an existing law or regulation?
- Should the Construction Contractor have provided for this in its bid: e.g., maintenance of traffic, providing fill materials, waste disposal, environmental protection, construction safety, etc.?
- Is the proposed modification actually a change in the work or does it actually fall into the category of accepted minimum standards of workmanship implied if not defined in any contract work?

The Grantee should review the documentation for this kind of request carefully to demonstrate that this is indeed a change.

Design Changes

A design change is a modification to an existing design which can be constructed and will operate properly without modification. In order to warrant consideration, it should meet one or more of the following conditions:

- Be cost-effective. That is, offer a savings in excess of all costs associated with the change order including future operation and maintenance costs.
- Respond to a proposal based on a construction incentive contract clause.

Design changes usually originate as proposals volunteered by the Construction Contractor, recommended by the Engineer or requested by the Grantee. The Grantee may see certain benefits such as reduced operating costs or improved operating efficiency. However, any such proposal deserves particularly careful analysis because the plans and specifications have already been determined to be adequate for project purposes by the reviewing agency.

The Grantee must receive prior written approval from the reviewing agency before authorizing changes which substantially alter the design, scope, type of treatment, location, size, capacity, quality of any major item of equipment or time of project completion. This category of change is likely to require prior approval because it often changes project scope or performance standards, so that the Grantee may wish to consider submitting all proposed changes under this category for prior approval by the reviewing agency.

Considerations for Evaluating Need for a Change

Considerations relating to design changes fall into five categories: general, substitution, revised site location, additions and deletions.

General

— Who originated the proposal?

— How will it differ from the original contract?

— When will an answer be needed? (Some design changes require prior approval.)

— Why was the alternative not considered during design? Is this the most cost effective alternative? Are there others?

— Who will guarantee the design change? (A Construction Contractor normally guarantees its work for a period of one year after it is accepted by the Grantee. The designer may be held liable for its own design for many years by state statute.)

— Does the change affect the timing or cost of other contracts?

— Will the change affect operation and maintenance?

— What are the secondary effects?

Substitution

Substitution is the exchange of specified equipment, material, or construction technique for another of equal, better, or lesser quality. The substitution may require a different installation technique from the design, with a resulting change in installation costs which far outweighs differences in material costs.

— Why can't the specified equipment or materials be supplied? On time?

— Is there a purchase contract? If so, when was it authorized? What written guarantees did the supplier make concerning performance? How does the supplier respond to charges of nonperformance? Will the supplier be liable for liquidated damages assessed by the Construction Contractor? Has the Construction Contractor expedited delivery? Who assumed risk for timely delivery or performance?

— Will the specified item be available from other suppliers? Within the time limitations? Who checked availability? What other suppliers were contacted? Give firm, date, and telephone number, name and title of persons contacted. Can the non-availability of an item be fully documented?

— Do the contract documents specify something impossible or a sole source?

— Why was this not questioned prior to bid and award? A responsible bidder would be expected to check availability of major materials and equipment when preparing a bid submittal.

— Will the proposed substitute be equal in all salient respects and compatible with other equipment and facilities? The Engineer should give a written opinion on this.

— Was the substitution proposal promoted as a result of some design, fabrication, or construction failure? Which?

— Does the proposed substitute circumvent the grant and statutory restrictions concerning non-restrictive specifications?

— Will the change relax the specification to permit use of less expensive materials and methods? How will EPA and the Grantee benefit? Will there be a fair credit? Will the relative order of bidders be changed?

— Will the proposal violate EPA's "Buy American" clause?

Relocation of Site

Relocation of site is a highly undesirable circumstance, since it opens Pandora's box to Construction Contractor claims, especially when done hastily in response to some unforeseen conflict. The Grantee should consider all secondary effects and be assured that a site relocation is the only feasible alternative.

— Why change the location? Was there a design error? Will it ease the Construction Contractor's task? Is the Grantee unwilling or unable to exercise eminent domain? Is there some benefit to the property owner?

— Are there environmental considerations? Does the change necessitate additional environmental and archeological review by municipal, state or federal agencies?

Additions

The Grantee should insure that proposed additions are within contract scope and project scope.

— Will the proposed item improve maintainability of the new grant-funded facility or existing facility? If both, in what proportion?

— For existing waste treatment facilities, will the change constitute normal maintenance for which the Grantee is solely responsible? Improvements to existing facilities to make the total system work are limited to those outlined in the Grant Agreement.

— For collector and transportation pipelines, will the proposed redesign conform to the Grant Agreement? Is there any public funding restriction (private connections, location, size and depth to serve future development)?

— Is this work considered restoration and is it outside the Construction Contractor's designated "work area"?

Deletions

Major deletions should not be accepted at face value. Often a careful review will reveal very extensive costs and secondary effects.

— Why was it initially in the design? Will the quality of the work be lowered by deleting the item?

— Is another item necessary to replace this one? Will the deleted work need to be done in the future, possibly at a higher cost than the proposed credit?

— What is the impact to the contract? Deleting an item which was priced too low may be of substantial benefit to the Construction Contractor.

Thus, the Grantee should evaluate the request for design changes to determine whether the proposed change will be cost

effective or respond to a proposal based on a construction incentive contract clause. It should be emphasized that considerable effort was expended in preparation and review of the existing adequate plan and there must be good reason to duplicate this effort.

(40 CFR 33.255; 33.710; 35.935-11; 35.936-13; 35.2204)

Overruns/Underruns in Quantities

Overruns/underruns occur when a difference develops between the quantity estimated in the bid schedule and the quantity actually required to complete the bid item. These differences occur only in contracts which are formulated as a series of bid unit prices for each unit (cubic yard, linear foot, etc.) of that item installed. They do not affect lump sum firm fixed price bids. When the differences are considerable, it can result in an unreasonable loss to either the Grantee or the Construction Contractor. The Grantee and Engineer should be alert to identify significant overrun/underrun trends as early as possible and avoid obligating funds which are not available.

When change orders increase or decrease the quantity of original contract items, the Grantee may need to review the unit price to allow for reasonable adjustment if there is a contractual "variations" clause where:

- The Grantee incurs unreasonable expense when an item priced too high has heavy overruns.
- The Construction Contractor sustains loss due to heavy overruns in an item priced too low.
- The Construction Contractor must absorb expenditures of general overhead costs which were included in the unit price for an item that was only partially used.

Most contracts contain provisions for significant differences in the "as built" quantities when compared with the estimated quantities. A provision required by EPA until May 12, 1982, states that should the final quantity differ from the original bid quantity by 15 percent or more, (less than 85 percent - more than 115 percent) the Grantee should consider negotiating new unit prices. The Grantee may negotiate an equitable adjustment in the unit price for that differential which exceeds the 15 percent margin.

Engineers are not always able to predict contract quantities to plus or minus 15 percent in advance. Realizing this, Construction Contractors sometimes speculate by entering high unit prices on those items they expect will overrun and low unit prices on those items which may underrun significantly. The technique is referred to as an unbalanced bid. The result may be unbalanced unit prices or prices which are not proportional to the estimated construction costs. However, where the Construction Contractor has large overruns in units where unit prices were underbid and there is no variations clause in the contract, a proposal to modify those unit prices may be developed. It should be evaluated on the basis of the foregoing discussion.

Additional clauses may have been included in the contract to minimize incentive for speculative bid unit prices such as to:

- Consider overruns/underruns for renegotiation only on major items (e.g., unit price multiplied by quantity equals or exceeds 10 percent of contract dollar amount) or high risk items (foundation excavation). The Construction Contractor's competitively bid unit prices are presumed sufficiently balanced that only large changes to major items will create an unfair hardship to either Construction Contractor or Grantee. From another point of view, the increased cost (or savings) resulting from an unbalanced unit price may be presumed distributed over the other contract items.
- Place a ceiling or maximum permissible change allowable in the unit price, e.g., 25 percent.
- Establish a minimum amount payable under the item to cover fixed costs.

Considerations for Evaluating Need for a Change

- Where did the difference in quantity occur when compared to the design estimate? Why did it vary?
- Does the "as built" quantity use the same method of measurement as specified quantity? Are there differing payment limits? Which method is specified?
- What documentation is available (e.g., field measurements, survey data, load slips, measurements of carrier, weight checks)?
- Is the variation in quantity caused by a different use of materials? Is this different use more a design change than an overrun?
- Is this excess included in the cost of some other item of construction in the specifications?
- Were quantity measurements made under conditions described in the specification? The density, and thus the volume, of soils depends on whether they are measured in the native, loose, or compacted states.
- Was the design estimate reasonable?
- Should more effective monitoring and measurement of quantities be instituted immediately?

A summary change order to establish the final quantities on a unit price contract is accepted practice. However, the Grantee should recognize the purpose and application of contract clauses which were intended to minimize unfair advantage and expense to the Grantee or the Construction Contractor caused by significant differences. These clauses are not necessarily justification for a change in price.

(40 CFR 35.938-5)

Factors Affecting Time of Completion

Six conditions impact time of completion, which is equally as important as costs: termination for convenience, termination for default, suspension of work, directed acceleration, time extensions and constructive acceleration. It should be pointed out that termination and suspension are not common actions on public sector construction.

Termination for Convenience

A clause of this type reserves the Grantee's right to terminate any or all portions of the contract work at any time during the course of the project, even though neither party has violated the contract or failed to perform. The Grantee must follow a prescribed course of notification and assumes control and ownership of facilities constructed to date. The Construction Contractor is entitled to an equitable adjustment. EPA-required contract provisions or model subagreement clauses reserve this right to the Grantee and provide a detailed procedure for evaluating the equitable adjustment when preparing the change order.

Termination for Default

If the Construction Contractor fails to perform all or portions of the work with sufficient diligence to ensure completion of the contract within the allotted contract time plus time extensions, the Grantee may terminate the Construction Contractor's right to proceed. The Grantee assumes ownership of facilities constructed to date, and can complete the project with its own forces or by using another contractor. The Construction Contractor is entitled to an equitable adjustment which includes: payment for work done and materials supplied to date, deduction of any additional cost over and above the contract amount which the Grantee incurs to complete the project, and deduction for damages sustained by the Grantee due to the Construction Contractor's default. EPA-required contract provisions or model subagreement clauses provide details for calculating this adjustment when preparing the change order.

The Grantee must observe the contractual rights of the Construction Contractor's bonding company or other surety to protect its right to have the project completed.

Suspension of Work

EPA-required contract provisions or model subagreement clauses contain a clause which reserves the Grantee's right to temporarily suspend or interrupt portions or all of the work for an appropriate period of time at the convenience of the Grantee. In a few cases, the Construction Contractor may be entitled to an equitable adjustment for any additional costs caused by this suspension particularly if the suspended work is on the critical path of the project schedule.

Directed Acceleration

The Grantee may determine that portions of the work or the entire contract must be accelerated from the original contract schedule. While directing acceleration of the work may be procedurally similar to ordering a temporary suspension, the Construction Contractor is less able to change the work schedule without additional cost.

Time Extensions

The Grantee, after determining the facts, may grant a time extension to the Construction Contractor for good cause. Otherwise, the Construction Contractor could be liable for contractual penalties, if any, resulting from failure to perform within the allotted time. A commonly used mechanism for controlling unjustified delays in contract completion is a liquidated damages clause in the contract. The clause generally assesses a dollar amount to be paid to the Grantee from the Construction Contractor for each day that the time required to complete the project exceeds the contract time. The amount is based on estimated damages which would be sustained by the Grantee. This clause is invoked only if the Construction Contractor has failed to complete the work by the designated time or fails to justify and obtain approval of time extensions. Since the Construction Contractor will generally provide a justification, the Grantee should keep complete time-related records in order to enforce this clause.

Constructive Acceleration

The Grantee should not ignore a justifiable request for a time extension since this can result in a Construction Contractor claim for constructive acceleration. This occurs when a Construction Contractor sustains additional costs by increasing forces or otherwise incurring added expense to overcome lost time which occurred through no fault of its own in order to avoid assessment of liquidated damages.

Considerations for Evaluating Need for a Change

- Was the cause of the delay beyond the Construction Contractor's control? Did the Construction Contractor fail to take normal precautions?
- Was the Construction Contractor ready and able to work?
- Did the Construction Contractor submit a detailed schedule projecting completion within the allotted time? Updated regularly? Did the updated schedule justify an extension?
- Did this schedule contain a "critical path analysis" or equivalent?
- Has the Construction Contractor maintained sufficient forces in those operations along the critical path where needed to meet target dates?
- How have causes other than normal weather beyond the control and without the fault or negligence of the Construction Contractor affected target dates along the critical path? Examples of these include acts of God, acts of the public enemy, acts of the Grantee, acts of another contractor in the performance of a contract with the Grantee, fires, floods, strikes, or unusually severe weather (e.g., A carpenters' strike lasting ten days may have only delayed the total project three days).
- Has the Construction Contractor proven "unusually severe weather" with such information as climatological data, return probability of severe storms, or flood depth data? Did the weather phenomenon actually delay operations along the critical path or secondary operations? Was the Construction Contractor shut down for other reasons?

Terminations, suspensions and extensions of time will necessitate processing a change order. Terminations for convenience or default are usually very complex and may require evaluation of the entire project. Other contract provisions in addition to EPA-required contract provisions or model subagreement clauses can affect the outcome. Extensions of time should be fully evaluated and justified. The Grantee is cautioned against awarding unwarranted time extensions, so that liquidated damages may not be unnecessarily forfeited.

Whenever time factors are part of a change order, they should be negotiated together with the other factors, not deferred or separately negotiated. In this way, claims for associated costs such as additional overhead during time extensions can be largely avoided.

(40 CFR 33.1030, Clauses 5 and 6; Part 35, Subpart E, App. C-2, Clauses 4, 5 and 6)

Preparation of the Change Order

The preparation of the change order by the Grantee requires familiarity with contract documents, assembling of pertinent information, negotiation, and careful documentation of the proceedings. The change order may be initiated by a request for proposal from the Grantee or as a claim or recommendation for change from the Construction Contractor. A claim is basically a request for relief because some action or inaction by the Grantee or a misrepresentation in the contract documents is alleged to have caused an involuntary change in the cost or time of performing the contract. It differs from the other methods of initiating the change order process, since the circumstances already exist and the Construction Contractor has announced the intention of pursuing an increase in the contract price or time.

While a request for proposal or a claim are general in nature, the change order proposal sets forth a full development of costs and work. It is a written offer by the Construction Contractor to perform or delete stated work in return for an adjustment for a certain amount of money or contract time (if needed).

The Grantee should examine a proposal very carefully to determine by reference to the appropriate section in the specification those items which are included, and those which are omitted. However, timely action on the proposal is equally important, since delays could increase the Construction Contractor's costs and possibly lead to secondary effects on project cost and completion time.

Before entering negotiations, the Grantee should be totally familiar with the options and incentives provided by the contract documents. Application of these tools can encourage the Construction Contractor to negotiate meaningfully.

The bilateral change order is the more common type, it is one agreed to by both parties, and it minimizes cause for disputes and claims at a later date. Should meaningful negotiations fail, the Grantee may issue a unilateral change based on the authority provided it by the EPA-required contract provisions or model subagreement clauses. For a unilateral change, the Construction Contractor, whose concurrence is not required, is entitled to an "equitable adjustment" for any difference in cost resulting from that change. Many contracts provide a formula for computing the adjustment. The threat of the use of the unilateral change plus other options provided for by contract can expedite meaningful negotiations.

Other options include deletion of the work covered by the change and performance of that work by the Grantee's own forces (which should be approved by the reviewing agency before starting work), or performance under a separate contract awarded to another construction contractor. However, a proposal deleting the changed work may entitle the Construction Contractor to an equitable adjustment for part, but not necessarily a prorata share, of the overhead and profit allocable to the changed work and not recovered elsewhere. The unilateral change should be invoked with caution since control over costs and time may be lost, the quality of the work may suffer and control of the contract may suffer.

Contract documents generally provide time limitations which the Construction Contractor must satisfy in order to be entitled to an adjustment. Likewise, the Grantee should respond in a timely manner, particularly in the case of a claim for extension of time. Failure to respond may be construed as a denial and, if the Construction Contractor fulfills the conditions for constructive acceleration, may recover damages from the Grantee.

Convinced of the need for a change order, the Grantee's next step is to negotiate the conditions of that change with the Construction Contractor and prepare the change order. Effective negotiation is a vital function of contracts administration. The Grantee should, as good business practice, prepare for negotiations with the same thoroughness as the Construction Contractor. There should be an exchange of background information, clarification of the scope of change, consultations with regulatory agencies where necessary, exploration of alternatives and secondary effects and cost and time considerations. Each party should formulate certain negotiable objectives of performance, price, and time.

(40 CFR 33.1030 Clause 3; Part 35, Subpart E, App. C-2, Clause 2)

Preparation For Negotiations

The Grantee is responsible for negotiating fair and reasonable cost and time for a necessary change order. Preparation for negotiations should include consideration of quality control, cost, alternative methods, secondary effects, and time. The Engineer's advice is normally sufficient for this preparation.

However, where the Grantee is faced with an unusually substantial and complex claim, it may wish to use an independent third party to prepare an assessment. This third party should provide whatever engineering and construction, financial, and legal expertise is needed to clarify the Grantee's position regarding costs, share of liability and amount at risk. By comparing the assessment to litigation/arbitration cost estimates and the Construction Contractor's potential settlement offer, the Grantee may find the claim close to resolution. It should be noted that written prior approval by the reviewing agency should be obtained before contracting with a third party if the Grantee wants this assistance added to the scope of the grant-eligible project.

Quality Control

Quality of materials and workmanship may be a negotiable item in some modifications. The corresponding price can vary over a considerable range. Any proposal for change should include a detailed description of work, plus a specification clearly defining quality of materials and workmanship.

Cost

Most changes clauses specify that an equitable adjustment should be agreed up-

on. The goal of an equitable adjustment is to leave the Construction Contractor in the same relative profit or loss position on the basic contract after the change order as if there had been no need to change the contract.

The Grantee should establish the cost of the change, insofar as possible, before the start of work. Pricing of the work after its completion is undesirable since it:

- Compromises the Grantee's ability to control project costs.
- Gives the Construction Contractor a distinct advantage in negotiations for extensions of time.
- Fosters a condition where the price agreement may be based upon cost plus a percentage of cost basis which is not allowed under EPA regulations.
- Fosters a pattern of overpriced proposals which delay agreement until after the work is completed.

At this stage, the Grantee should have the Construction Contractor's price proposal, the Engineer's independent cost estimate and possibly an independent third party's assessment if necessary for comparison. The Grantee should be prepared to negotiate cost plus a fair profit, including reductions in overhead and profit for deleted work. Under grants awarded before May 12, 1982, the Construction Contractor is required by EPA regulations to submit sufficient cost and pricing data to the Grantee to enable the Grantee to determine the necessity and reasonableness of costs. Under grants awarded on or after May 12, 1982, the Grantee is required by EPA regulations to conduct a cost or price analysis for all negotiated change orders estimated to exceed $10,000.

(40 CFR 33.290; 33.1030, Clause 8; 35.938-5)

Alternative Methods

There are generally a number of alternative methods of meeting the objective of the proposed change. The Construction Contractor, being the most knowledgeable about its operating costs, can often suggest economies in construction methods or materials not apparent to a Grantee. The cost effectiveness of the alternatives presented should be compared after a technical analysis, taking into account future operation and maintenance costs. Whether the change is needed to complete the project should also be considered, since the "no change" alternative may in fact be the most cost effective choice over the design life of the project.

Secondary Effects

A seemingly minor contract change may have secondary impacts which are many times more costly than the original change order amount. Assessment of secondary effects presupposes a thorough understanding of the project design, contract documents, and the Construction Contractor's schedule and construction techniques. Failure to properly assess secondary effects may undermine the cost effectiveness justification supporting the proposed changes.

The following example will illustrate secondary effects:

A change is proposed to increase the size and capacity of a pump. The proposed pump may no longer be compatible with intake or discharge piping, power source, housing, mounting hangers, or electrical controls.

Some of the conflicting parts may already be ordered or installed. Many of the costs may be duplicated, plus, should any portion of the duplicated work or delivery time impact the critical path schedule, the contract completion date may be delayed.

The prime Construction Contractor may guarantee and absorb any unforeseen subcontractor costs; however, any portion of the work or related work constructed by another prime contractor should be assessed for costs and time impacts. On projects with multiple prime Construction Contractors and on fast-track projects, the Grantee generally has assumed the responsibility for coordination and may be liable for the secondary impacts on related prime Construction Contractors.

The designer may be entitled to additional fees for design (if not to correct an error or omission); plus, if the change results in an extension of time, there may be additional inspection costs.

If the electrical controls are provided by another prime contractor and need modification, another contract change may be generated.

Time

Time affects price. It is unlikely that a realistic price can be negotiated without the parties agreeing or being close to agreement on the time adjustment required. Deferral of time negotiations to a later date suffers from the same criticisms as after-the-fact pricing, since it:

- Relieves the Construction Contractor of pressure to complete the work in a timely manner. However, if time negotiations are deferred, the Construction Contractor must still prove the basis for delays.
- Places the Construction Contractor in the advantageous position of negotiating from actual time. This can be countered by keeping construction schedules up to date.
- Creates a danger of constructive acceleration due to failure to issue justified time extensions promptly.

Approval of a change order for time extension may extend the amount of engineering and inspection needed on the project.

Approval of a time extension will not relieve the Grantee from anv obligations that the state or EPA may have imposed upon the project.

In addition to the Construction Contractor's proposal for time extension, the Grantee should make its own independent estimate (normally prepared by the Engineer).

Memorandum of Negotiation

It is good construction management practice to keep a memorandum of the negotiations pertaining to a change order. The amount of detail and formality involved in the memorandum should definitely be not more than is justified by the complexity of the work and cost involved.

A record of these negotiations documents that the parties have a clear understanding of the proposed changes and jointly evaluated the reasonableness of the proposal. These should include considerations of quality, cost, alternative methods, secondary effects, and time. The memorandum should be prepared at the negotiating table and signed by all attending. Immediate documentation minimizes misinterpretation and memory failure.

The parties may not reach agreement on some or all of the items discussed. The disagreements are often more significant than the items resolved. Those items which are not resolved or are not negotiable should also be recorded, stating the position of each side and whatever reservation of rights is necessary. The reasons for disagreement must be clearly documented. A multipart bilateral change order can then be executed for the resolved items and one or more unilateral change orders issued for those unresolved items which must proceed. The Construction Contractor may then seek a remedy through renewed negotiation, arbitration or litigation.

A number of unrelated items may be discussed at the same session and included in one memorandum. The Memorandum of Negotiation should contain the following information:

- Project name and number, location, date.
- Contract name and number.

- Names of persons representing Construction Contractor, Grantee, Engineer.
- Description of proposed change (Attach revised specification, plan, sketches, shop drawings, etc.) station location, plan sheet number.
- Discussion of alternative methods of meeting objective and quality considerations.
- Construction Contractor's price proposal.
- Engineer's independent estimate of cost and time changes.
- Explanation for recalculation or disagreement.
- Statement of total cost changes including secondary costs.
- Statement of total time changes.
- Assurance that complete cost of secondary effects has been included.
- Dated signatures of persons attending.

The Memorandum is not a notice to proceed, nor is it a change order. It should be used in the preparation of the change order and retained in the Grantee's files for possible later use by the reviewing agency.

Change Order

The change order is the formal document which alters some condition of the contract documents. The change order may alter the contract price, schedule of payments, completion date, plans and specifications.

It specifies the agreed upon change to the contract and should include the following information:

- Identification of the change order
- Description of change
- Reason for change
- Change in contract price
- Change in unit prices (if applicable)
- Change to contract time
- Statement that secondary impacts are included
- Approvals by Grantee's and Construction Contractor's authorized representatives

The Grantee may require the Engineer's signature for internal control, but this is not a substitute for the Grantee's signature.

Notice to Proceed

Before proceeding with the work, the Construction Contractor may require a "Change Order Notice to Proceed" (standard forms available from professional and trade associations) from the Grantee. If needed, the Grantee can provide notice to proceed immediately unless prior approval from the reviewing agency is required. The notice to proceed may be made a part of the change order, allowing the Construction Contractor to proceed upon execution of the change order by both parties.

Submitting a Change Order to the Reviewing Agency

EPA regulations intend that the level of detail required in a change order and attachments depends on the dollar amount and complexity of the change. For changes with a price of $10,000 or less, abbreviated documentation should be used such as, for example, a telephone memorandum to serve as a Memorandum of Negotiation. As another example, sales slips, quotations, catalogs and price lists can be used to support the price paid. By using shortened procedures and by grouping changes to be administered in one change order, preparation costs should be kept reasonable in relation to the dollar value of the change. However, related work should not be separated into several change orders just to take advantage of shortened procedures.

Submittal requirements also depend on the date upon which the grant was awarded. For grants awarded before May 12, 1982, the change order approval request and attachments should be submitted to the reviewing agency as soon as a change order has been signed unless the Grantee self-certifies its procurement system. Allowable costs can then be included in the next payment request.

For grants awarded on or after May 12, 1982, change orders would not need to be submitted to the reviewing agency, unless the Grantee self-certifies that its own procurement system does not meet the intent of EPA regulations. However, these change orders will be subject to audit by the reviewing agency at the completion of the project. Documentation should therefore be completed, except the approval request, and filed by the Grantee.

In order to assist the Grantee in preparation of the change order approval request, the information typically required by the reviewer has been listed under *Screening Process* on page 12. This request formally notifies the reviewing agency that a change has been made to the contract documents and asks for change order approval and determination of allowability of any additional costs or time for federal participation. Since the memorandum of negotiation, change order and notice to proceed (if any) will be included with the request, it is suggested that information given on them not be duplicated on the request itself.

The request must be signed by the Grantee prior to submission to the reviewing agency. As with the change order, the Engineer's and Construction Contractor's signatures may be required as a part of the Grantee's internal control procedures, but this is not a substitute for the Grantee's signature. Supporting documentation should be referenced and then attached to the change order request.

The Grantee is expected to keep all change order documentation on file for 3 years following final grant payment. If a change order is the subject of a controversy (such as a claim) or audit within the 3 years, the period shall be extended until resolution of the controversy or audit.

The Grantee should also check with its State agency which has reviewed the construction drawings and specifications to determine if there are any additional change reporting requirements, such as modifications to a State-issued building permit.

(40 CFR 33.001; 33.110)

Reviewing Agency Procedures

The reviewing agency's responsibility is to determine if a change order request complies with and satisfies the requirements of the U.S. Environmental Protection Agency's (EPA) construction grants program on two points. The first is whether the work would be considered a major change and therefore, in many cases, a significant alteration of the previously approved plans and specifications. The second is whether the reviewing agency should commit additional federal and/or state funds to the project. To do this, the reviewer should be thoroughly familiar with the program, the specific grant conditions, the contract documents and the following procedure for consideration of a change order.

Each reviewing agency has developed its own checklists for review of change orders, which may be more or less detailed than what is provided here, so that the Grantee should discuss those procedures with the particular reviewer who is involved. The procedure that follows is organized so that the more detailed analysis required in the succeeding steps need only be performed if each earlier step is already satisfied. Thus, the change proposal need not be thoroughly analyzed if the request is deferred or rejected at an earlier stage. A point which needs to be re-emphasized here is that the detail required by the reviewer should not be more than is justified by the complexity of the change and cost involved.

Even though each reviewing agency's requirements will differ, the process should be generally the same and in the following sequence:

- Screening of change order materials.
- Verification of prior approval requirements.
- Determination of federal and/or state funding participation, based upon:
  - — Need for change.
  - — Reasonableness of the method of accomplishing the objective.
  - — Eligibility of the change.
  - — Allowability of the costs.
- Documentation of the review procedures.
- Notification to the Grantee.

Screening Process

The change order approval request should first be screened to determine whether the information and documentation provided are sufficient for the subsequent more detailed review. Checklists are a common, effective technique used to insure that each item is verified. Later, they document the following: who reviewed which items, when, and what the results were. Also, where two or more agencies check portions of the same request, the checklist clearly states which items were reviewed and by whom. A schedule of important items to be included in a reviewing agency's checklist for the screening of change order requests is provided below.

Identification of change order request.

- Project name.
- Contract name and number.
- EPA Project number.
- State Project number.
- Grantee name.
- Change Order number.
- Date.
- Names, addresses and telephone numbers of Grantee, Construction Contractor and Engineer representatives.
- State approval, name, title, date.

Prior Approval.

- Required from reviewing agency?
- Obtained from reviewing agency?

Need for change.

- Clear understandable statement.
- Cause and remedial change.
- Reason why not in original contract.
- References and attached substantiating documentation.
- Applicable contract provisions cited and compliance.

Description of change.

- Clear statement, not ambiguous.
- Revised plan and specification sheets referenced and attached.
- Design data and calculations attached.
- Scope of change is clear.
- Change is within project scope.
- Design is adequate.
- Revised material or construction method is (equal to) (less than) (better than) specified construction.
- Will revision increase/reduce time and/or cost of construction?
- How are operation and maintenance costs affected?
- Is arithmetic correct?
- Does agency inspection report verify accuracy of statements?
- Does other substantiation verify accuracy? Grantee inspector reports, laboratory tests, pictures, others.

Change to contract price

- Dollar amount of change shown (zero for no change).
- Construction Contractor's cost breakdown.
- Profit entered separately.
- Engineer's independent estimate including verification of costs for new items.
- Documentation referenced, attached.
- Are unit prices in accordance with contract documents and regulatory requirements?

Change to contract time.

- Statement of number of days or zero days.
- Documentation referenced and attached.

Non-federal funding is properly certified and authorized.

Approvals.

- Signature(s) entered and dated.
- Execution of signature(s) agrees with prior approval requirement.
- Change order signature(s) entered and dated.
- Execution of change order signature(s) agrees with prior approval requirement.

Attachments are listed and attached.

- Memorandum of Negotiations.
- Cost and pricing data attached and certified by Construction Contractor (if in excess of regulatory limit).
- Change Order and Notice to Proceed (if required).

If it has been determined that the change order approval request has adequately met the screening criteria, then the reviewer can proceed to a determination of whether the prior approval requirements have been met. If the request has failed to meet the screening criteria, then further information should be requested.

Prior Approval Requirements

Written approval from the reviewing agency prior to the start of work associated with the change is often required. The conditions which require prior approval were previously discussed in *Prior Approval Requirements* on page 3. After the change order approval request has been screened, the reviewer must determine whether the scope and conditions of the change would have required prior approval. If so, a check must be made whether the approval had been given prior to the start of the change-related work. The actual work done must be reviewed to see whether it conforms fairly closely with the terms of the prior approval. If there is a substantial difference, the work would have to be considered done without prior approval.

When the work would have required prior approval and it was not given, the reviewer must then decide whether to seek a deviation from the pertinent regulation, (see *Prior Approval Requirements* on page 3) or to disapprove the cost of the change. On the other hand, when the change had received prior approval or did not require it, the reviewer can then proceed to the determination whether federal and/or state participation in the funding of the change should be approved.

This is an appropriate point to remind the reviewer of the need to act as expeditiously as possible on prior approval requests. Delays could increase the Construction Contractor's costs and possibly lead to secondary effects on both project cost and completion time.

Determination of Federal and/or State Funding Participation

The reviewer's determination on whether to approve additional federal and/or state funding for a change would be based on the Grantee's analysis of the need and demonstration of the reasonableness of the means for accomplishing the changed work. Following that, the reviewer must determine that the change consists of eligible work and that its costs are allowable.

Review of the Need for Change

Expeditious processing of the change order is necessary in order to deal with the inevitable changes in circumstances or conditions which arise during the course of construction and require increases or decreases to the work, cost and time for completion. These changes can generally be classified into the following six categories: differing site conditions, errors or omissions in plans and specifications, changes instituted by the regulatory agencies, design changes, overruns/underruns in quantities, and factors affecting time of completion.

It is possible that some change order request submissions may fall outside of these categories. However, those requests would have sufficiently similar characteristics that the reasoning process developed in one or more of these six categories could be used.

The reviewer must determine that sufficient evidence has been provided to demonstrate the need for a change. While this is largely a subjective judgment, it should avoid being a second-guess of whether there is a need. It should instead be a determination whether the Grantee made a reasonable analysis, using a rational basis such as in the chapter entitled *Conditions that May Warrant a Change Order* on page 4. If the evidence of need has not been affirmed, the request should be returned to the Grantee for further justification.

The reviewer should give particular attention to the regulatory prohibition against funding change orders resulting from Grantee mismanagement or the Grantee's vicarious liability for the improper actions of others.

(40 CFR 30.600)

Reasonableness of the Method of Accomplishing The Objective

This evaluation is based on consideration of the quality, cost, alternate methods, secondary effects of the change and the impact on completion time. The following items should assist in the evaluation of the change order for reasonableness:

Quality considerations.

- Is quality of change equal to, less than, or greater than original work?
- If greater, is it justified?
- If less, is a credit offered?
- Does it equal or exceed minimum technical standards?
- Does it require additional review under the National Environmental Policy Act?

Cost review.

- Have cost and/or price analyses been performed?
- Do cost and quality match up?
- Is the cost fair and reasonable?
- Is a cost-effectiveness analysis needed? What is its conclusion?

The reviewer may evaluate the cost of proposals by either or a combination of two methods: cost and price analysis.

Using the cost analysis method to evaluate proposals involves a detailed review of the cost components plus profit. Cost components include direct and indirect items of cost. Direct costs include labor, fringe benefits, equipment and material costs directly attributable to the performance of the changed work. Indirect costs include insurance, bonding, overhead, and other similar costs which may be allocated and represented as a percentage of direct costs.

Using price analysis, the Grantee compares the price of an item with other estimates, bids, or quotations for similar items. Individual components of the price are not evaluated separately. Care must be exercised when comparing prices to determine the similarities and differences between the items.

Alternate methods.

- What other alternatives were considered to accomplish the objective?
- Is the evaluation of alternatives (including no change) adequate considering the scope of complexity of the change?
- Is this alternative cost-effective?
- How does it affect future maintenance costs?
- Is the change necessary to complete the project?

Secondary effects of the change.

- Are there secondary effects?
- Are the secondary effects evaluated?
- Is this change order the unforeseen or miscalculated result of a previous contract change?
- Are the cost analyses for secondary effects complete and reasonable?

Impact on time of completion.

— How does the change impact on the time of completion?

— Is the Grantee legally obligated to grant extension of time?

— Is the Grantee obligated to pay for the additional costs incurred by the time extensions?

If the method for accomplishing the change has been determined to be reasonable, then the reviewer must proceed to determine the eligibility of the change order request. If the reasonableness has not been affirmed, the request may either be referred to the Grantee for further clarification or may be denied partial or complete Federal funding participation.

(40 CFR 30.700)

Eligibility of the Change

Eligible costs are those costs in which federal participation is authorized by the particular statutes which govern that grant. A finding of eligibility for a particular item of work means that the description of this work fits within the limitations set forth by applicable statutes. Sources of authority for funding eligibility include those shown below and the reviewer must determine which statute is applicable to the specific project.

- Public Law 84-660 (enacted July 9, 1956 and amended through November 3, 1966): authorized publicly owned wastewater treatment plants, intercepting and outfall sewers, and waste water pumping facilities.
- Public Law 92-500 (enacted October 18, 1972): added collector sewers and land integral to the treatment process.
- Public Law 95-217 (enacted December 27, 1977): added privately owned treatment works if overseen by a public agency.
- Public Law 97-117 (enacted December 29, 1981): restricted new grants for sewer replacement/rehabilitation, new collector sewers and combined sewer overflow correction after September 30, 1984.

Eligibility determinations are made when the construction grant is approved. Additional screening for eligibility of each change order must be made on the basis of the following limitations which are common to all the foregoing statutes:

- Is the change related to the construction of publicly owned treatment works?
- Is the request related to approved plans, specifications and cost estimates?
- Is it not included in any work previously determined to be ineligible (unless eligibility criteria changes)?
- Is the change related to that which is necessary to maintain effluent limitations and schedules of compliance?
- Are EPA funds available from the current State allotment?
- Is there assurance of the availability of additional non-federal share funds, if necessary?
- Are the size and capacity, including reserve capacity, related to needs?
- Are there any proprietary, exclusionary or discriminatory requirements other than those based on performance?
- Is the change cost effective?

If the reviewer determines that the change order request is eligible, and that cost can be allocated to the extent of benefit properly attributable to the project, the request must then be reviewed for allowability. Should the request be determined to be ineligible, the request must be denied grant funding.

(40 CFR 30.705)

Allowability of the Costs

Project costs are allowable if the project is authorized by applicable statutory provisions, as previously discussed under *Eligibility of the Change*, and payment is allowed under applicable regulatory provisions. These provisions also apply to an allowability determination for a change order and are as follows:

- The costs must be reasonable and within the scope of the project (reasonableness has been analyzed under *Reasonableness of the Method of Accomplishing the Objective* on page 13).
- The cost is allocable to the extent of benefit properly attributable to the project (appropriate allocation of costs has been analyzed previously under *Eligibility of the Change*).
- Such costs must be accorded consistent treatment through application of generally accepted accounting principles.
- The cost must not be allocable to or included as a cost of any other federally assisted program in any accounting period (either current or prior).
- The cost must be in conformity with any limitations, conditions, or exclusions set forth in:

— the grant agreement.

— 40 CFR, Parts 30 and 35. Particular attention should be paid to:

  • 40 CFR 30.710(a), referencing OMB Circular A-87 Rev., which provides principles for determining allowable costs for all grants awarded to state and local governments.

  • 40 CFR 35.940 "Determination of Allowable Costs" for grants awarded before May 12, 1982, or Appendix A of Part 35, Subpart I for those awarded on or after that date.

— 41 CFR 1-15.2 and, if appropriate, 1-15.4 which provide comparable principles for determining allowable costs for contracts between the Grantee and the Construction Contractor.

— Chapter VII, Section B, *Allowable and Unallowable Costs* in the *Handbook of Procedures for the Construction Grants Program for Municipal Wastewater Treatment Works* for grants awarded before May 12, 1982.

— Program Requirements Memoranda and policy memoranda published and adopted by the Office of Water Program Operations, U.S. EPA, as applicable based on the date of grant award.

Grantee Management Review

The reviewer may notice that one or a group of change orders indicate that significant Grantee project management improvements are needed to insure that project objectives will be met. In this situation, the reviewer should recommend to his or her supervisor that particular attention be given to the project. One option available to reviewing agency is a recommendation to the Grantee that an experienced construction manager be retained. Another option is for the reviewing agency to request that an evaluation of the Grantee's construction management organization be performed. This type of review would be requested from and coordinated by EPA headquarters.

Grantee Notification

The Grantee must be formally notified of the action taken on the completed change order request. This notification informs the Grantee of one of the following actions as applicable:

- If prior approval is required:

— costs of change order are allowable (or partially allowable as stipulated).

— costs of change order are not allowable.

- If prior approval not required:

— change order is approved and costs are allowable (or partially allowable as stipulated).

— change order is approved, but costs are not allowable.

— change order is not approved and the reason.

- In all cases, that approval of a project change does not obligate EPA to any in-

crease in the amount of the grant or grant payments unless an amendment to increase the grant is also approved. This limitation should be stated in the approval and appropriate action taken toward amending the grant if necessary. The Grantee should also be informed of any restrictions on grant amendments, such as the State agency denying certification of a grant increase or any regulation which limits grant increases.

Appeal of Allowability Determination

The Grantee may appeal a determination of allowability to the Regional Administrator within 30 days of its receipt. This applies to determinations by the state agency or EPA project officer. Details and appeals procedure are explained in 40CFR 30.1100 and 35.960, plus 35.1030-9 for determinations by delegated state agencies.

Documenting the Project File for Change Orders

The reviewer must maintain in the project file a list of the allowable and unallowable dollar amounts of each change request, plus the cumulative dollar amounts to date. Allowable time extensions and current time of completion should also be listed.

Interim reimbursement payments to the Grantee may include the value of approved change orders if requested. The reviewer will determine that a reimbursement request is based upon the sum of original contract amount, plus only allowable costs for contract changes, not to exceed the grant amount as amended.

Each change order should be shown separately, in numerical order, with its individual tabulation of quantity and payment. If the change affects an original contract quantity, the change will still appear separately, since there may be a time lapse between Grantee processing and EPA approval. A change which alters an original contract quantity or price will reference that original item.

The reviewer will file the following documents, as applicable, with the contract changes:

- Request for change order approval - signed and dated copy - with attachments as follows:
  - — Memorandum of negotiation including the Engineer's independent estimate (if requested by the reviewing agency).
  - — Change order.
  - — Notice to proceed (if prior approval is required, notice will be furnished separately).
- Reviewer's checklist - signed and dated copy.
- Notification of approval or disapproval.
- Request for additional information or clarification.
- Memoranda of meetings.
- Telephone conversations - notes of the reviewer.
- Inspection Reports - review agency inspector.
- Project cost summary - updated.

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